

WHAT IS CLAIMED IS:

1. A discharge lamp comprising:

an enclosure in which a discharging gas is sealed;
and

5 a pair of electron-emitting members sealed in the enclosure between which a voltage is applied, each of the electron-emitting members comprising, at a surface thereof, a plurality of conductive micro-tips and an electron-emitting film which supports said plurality of
10 conductive micro-tips and is made of a material whose secondary emission efficiency is higher than that of a material for the conductive micro-tips with respect to the discharging gas.

2. The discharge lamp according to claim 1,
15 wherein said plurality of conductive micro-tips are made of carbon including SP2 hybrid orbital bonds.

3. The discharge lamp according to claim 1,
 wherein said plurality of conductive micro-tips include at least one selected from the group of carbon
20 nanotubes, carbon fullerene, and carbon onion.

4. The discharge lamp according to claim 1,
 wherein the electron-emitting film is made of carbon including SP3 hybrid orbital bonds.

5. The discharge lamp according to claim 1,
25 wherein the electron-emitting film is made of diamond.

6. The discharge lamp according to claim 1,
 wherein said plurality of conductive micro-tips are

made of carbon including SP2 hybrid orbital bonds, and the electron-emitting film is made of carbon including SP3 hybrid orbital bonds.

7. The discharge lamp according to claim 1,
5 wherein said plurality of conductive micro-tips include at least one selected from the group of carbon nanotubes, carbon fullerene, and carbon onion, and the electron-emitting film is made of diamond.

8. The discharge lamp according to claim 1,
10 wherein at least a part of said plurality of conductive micro-tips are embedded in the electron-emitting film.

9. The discharge lamp according to claim 1,
wherein the discharging gas contains hydrogen.

10. A discharge lamp comprising:
15 an enclosure in which a discharging gas is sealed;
a pair of electrodes placed in the enclosure on each of which an electron-emitting member is provided, the electron-emitting member comprising, at a surface thereof, a plurality of conductive micro-tips and
20 an electron-emitting film which supports said plurality of conductive micro-tips and is made of a material whose secondary emission efficiency is higher than that of a material for the conductive micro-tips with respect to the discharging gas; and
25 a pair of leads which draw the pair of electrodes outside the enclosure.

11. The discharge lamp according to claim 10,

wherein said plurality of conductive micro-tips are made of carbon including SP2 hybrid orbital bonds.

12. The discharge lamp according to claim 10, wherein said plurality of conductive micro-tips include
5 at least one selected from the group of carbon nanotubes, carbon fullerene, and carbon onion.

13. The discharge lamp according to claim 10, wherein the electron-emitting film is made of carbon including SP3 hybrid orbital bonds.

10 14. The discharge lamp according to claim 10, wherein the electron-emitting film is made of diamond.

15 15. The discharge lamp according to claim 10, wherein said plurality of conductive micro-tips are made of carbon including SP2 hybrid orbital bonds, and the electron-emitting film is made of carbon including SP3 hybrid orbital bonds.

20 16. The discharge lamp according to claim 10, wherein said plurality of conductive micro-tips include at least one selected from the group of carbon nanotubes, carbon fullerene, and carbon onion, and the electron-emitting film is made of diamond.

17. The discharge lamp according to claim 10, wherein at least a part of said plurality of conductive micro-tips are embedded in the electron-emitting film.

25 18. The discharge lamp according to claim 10, wherein the discharging gas contains hydrogen.

19. A discharge lamp comprising:

an enclosure in which a discharging gas is sealed;
a pair of electrodes placed on an outside surface
of the enclosure;

a pair of electron-emitting members which is
5 formed on an inside face of the enclosure facing the
pair of electrodes via the enclosure, each of the
electron-emitting members comprising, at a surface
thereof, a plurality of conductive micro-tips and an
electron-emitting film which supports said plurality of
10 conductive micro-tips and is made of a material whose
secondary emission efficiency is higher than that of
a material for the conductive micro-tips with respect
to the discharging gas.

20. The discharge lamp according to claim 19,
15 wherein said plurality of conductive micro-tips are
made of carbon including SP2 hybrid orbital bonds.

21. The discharge lamp according to claim 19,
wherein said plurality of conductive micro-tips include
at least one selected from the group of carbon
20 nanotubes, carbon fullerene, and carbon onion.

22. The discharge lamp according to claim 19,
wherein the electron-emitting film is made of carbon
including SP3 hybrid orbital bonds.

23. The discharge lamp according to claim 19,
25 wherein the electron-emitting film is made of diamond.

24. The discharge lamp according to claim 19,
wherein said plurality of conductive micro-tips are

made of carbon including SP2 hybrid orbital bonds, and the electron-emitting film is made of carbon including SP3 hybrid orbital bonds.

25. The discharge lamp according to claim 19,
5 wherein said plurality of conductive micro-tips include at least one selected from the group of carbon nanotubes, carbon fullerene, and carbon onion, and the electron-emitting film is made of diamond.

26. The discharge lamp according to claim 19,
10 wherein at least a part of said plurality of conductive micro-tips are embedded in the electron-emitting film.

27. The discharge lamp according to claim 19,
wherein the discharging gas contains hydrogen.